# The E895 experiment at the AGS

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The acceleration of Au beams at the Brookhaven National Laboratory's AGS accelerator facility has made it feasible to investigate the bulk characteristics of nuclear matter and its Equation of State (EOS) at high energy and baryon density. Latest experimental data and theoretical calculations on collective phenomena at low beam energies suggest that highest compression of nuclear matter might occur in the 2-10 A GeV energy range. Moreover, the potential for interesting new physics exist in the form of resonance matter and signals of phase transitions such as QGP[2] and chiral symmetry restoration[3].

The E895 experiment has, for the first time at the AGS, carried out an excitation study of Au induced reactions in fine detail. Specifically, E895 is currently studying particle production yields and cross-sections, global characteristics and energy spectra, multiparticle correlations, directed flow in symmetric and asymmetric systems, radial flow and squeeze-out of light fragments, pion production and shadowing (anti-flow) effects, and strangeness production.

E895 has the unique ability to measure the four-momentum of light mass particles, projectile fragments from Z=6 to Z=79, and anti-particle production. All of the data was collected on an event by event basis from a Time Projection Chamber (EOS TPC). The EOS TPC provides continuous tracking, almost $4\pi$ acceptance and particle identification for the light mass particles. Projectile fragments are identified in a multiple ionization sampling device called MUSIC. In this way full event reconstruction allowed simultaneous measurement of many experimental observables.

The E895 experiment[1] was made operational at BNL and, in December 1995, had a sucessful first run using low energy Au beam from the AGS. High statistics data was recorded using the 2 and 4 A GeV Au beams impinging on a Au target, and with less statistics on Ag, Cu and Be targets. During the second run in 1996 data was recorded at 6 and 8 A GeV using the same combination of targets.

Preliminary online analysis showed good dE/dx particle identification in the TPC. The p,d,$^3H$,$^4He$,$K^+$ and pion bands were visible over a wide rigidity range. Multiplicity and rapidity distributions along with transverse momentum spectra were also extracted from the uncalibrated data. Figure 1 is representive of the quality of pion data and highlights the very low $P_t$ acceptance of the experiment. A complete offline data analysis effort is now underway at LBNL utilizing the Parallel Distributed Scientific Farm (PDSF) at NERSC.

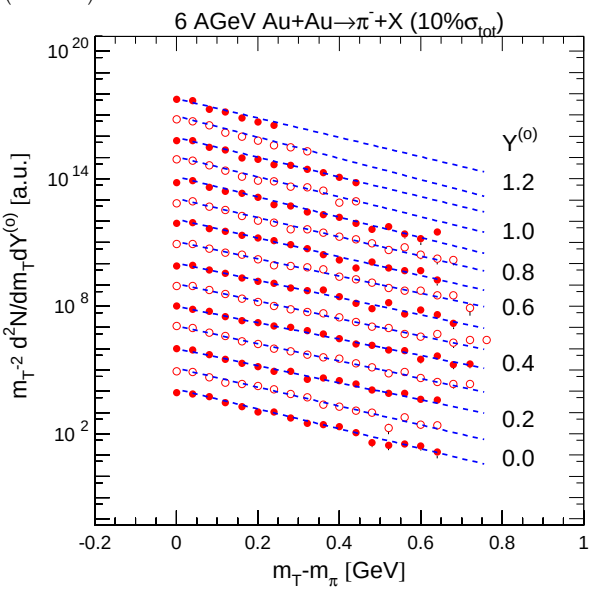


Figure 1: Pion $P_t$ spectra at 6 A GeV for Au+Au collisions plotted for various rapidity intervals

## References

[1] G. Rai et al., AGS Proposal, LBL-PUB-5399, 1993

[2] D. Rischke, Proc. HIPAGS,(1996),138

[3] B.A. Li and C.M. Ko, Nucl. Phys. A601,(1996),447